

Low Noise Millimeter Wave LNA, Phase II

Completed Technology Project (2009 - 2013)



Project Introduction

A broadband G-Band low noise amplifier has been designed using a 50nm MHEMT. The MHEMT model that was used for the design was measured.

Anticipated Benefits

The G-Band amplifier that will be developed under the Phase II program has significant NASA commercial applications. Many of NASA's remote sensing satellites for weather forecasting and tracking presently have water band sensors that operate at G-Band. However, these sensors have limited capability since low noise amplifiers are not available at the present time. These systems presently have mixer front ends with limited sensitivity. The G-Band low noise amplifier will greatly enhance the sensitivity of these systems as well as providing more accurate weather forecasting and tracking of storms such as hurricanes. The fact that the MMIC is based on a proven space process and can be inserted into space systems almost immediately is a unique advantage for this design. The development of the low noise G-Band amplifier using the 50nm device is an advancement in the state-of-the-art for low noise amplifiers. The innovative design can then be used to advance the low noise performance of MMIC amplifiers down to the microwave region. They can also be used to enhance the sensitivity of commercial satellite communication systems. In addition, the emerging market for imaging systems in the submillimeter and THz region could use a MMIC amplifier with this performance. In fact, JJW Consulting has developed and shipped a 140GHz Imaging system that was to be used for an all-weather landing system. The system used a 140GHz LNA. The sensitivity of this system could be enhanced by the inclusion of these amplifiers.



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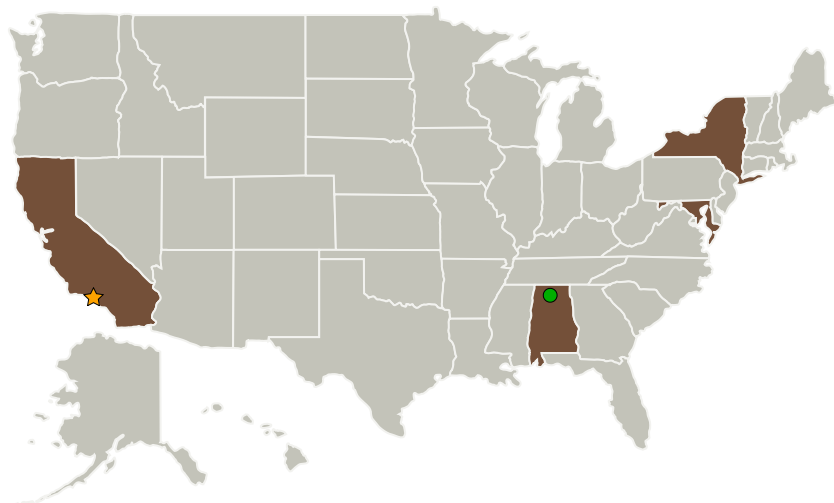
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Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★ Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
JJW Consulting, Inc.	Supporting Organization	Industry	North Amityville, New York
● Marshall Space Flight Center(MSFC)	Supporting Organization	NASA Center	Huntsville, Alabama

Primary U.S. Work Locations	
Alabama	California
Maryland	New York

Project Transitions

▶ **February 2009:** Project Start

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Project Manager:

Gary C Jahns

Principal Investigator:

James Whelehan

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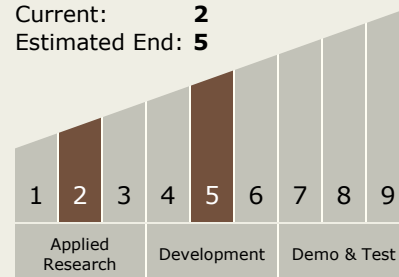
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✓ **May 2013:** Closed out

Technology Maturity (TRL)

Start: **2**
Current: **2**
Estimated End: **5**



Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.1 Remote Sensing Instruments/Sensors
 - └ TX08.1.2 Electronics